SEQUENCE LISTING

<110> Collins, Peter L.
       Murphy, Brian R.
       Whitehead, Stephen S.

<120> PRODUCTION OF ATTENUATED CHIMERIC RESPIRATORY SYNCYTIAL VIRUS
       VACCINES FROM CLONED NUCLEOTIDE SEQUENCES

<130> NIHB-2264

<140> US 10/722,000
<141> 2003-11-25

<150> US 09/291,894
<151> 1999-04-13

<150> US 08/892,403
<151> 1997-07-15

<150> US 60/047,634
<151> 1997-05-23

<150> US 60/046,141
<151> 1997-05-09

<150> US 60/021,773
<151> 1996-07-15

<160> 38

<170> PatentIn version 3.5

<210> 1
<211> 15223
<212> DNA
<213> Respiratory Syncytial Virus

<400> 1
acgcgaaaaa atgcgtacaa caaacttgca taaaccaaaa aaatggggca aataagaatt   60

tgataagtac cacttaaatt taactccctt ggttagagat gggcagcaat tcattgagta   120

tgataaaagt tagattacaa aatttgtttg acaatgatga agtagcattg ttaaaaataa   180

catgctatac tgataaatta atacatttaa ctaatgcttt ggctaaggca gtgatacata   240

caatcaaatt gaatggcatt gtgtttgtgc atgttattac aagtagtgat atttgcccta   300

ataataatat tgtagtaaaa tccaatttca caacaatgcc agtactacaa aatggaggtt   360

atatatggga aatgatggaa ttaacacatt gctctcaacc taatggtcta ctagatgaca   420

attgtgaaat taaattctcc aaaaaactaa gtgattcaac aatgaccaat tatatgaatc   480

aattatctga attacttgga tttgatctta atccataaat tataattaat atcaactagc   540

aaatcaatgt cactaacacc attagttaat ataaaactta acagaagaca aaaatggggc   600

aaataaatca attcagccaa cccaaccatg gacacaaccc acaatgataa tacaccacaa   660

agactgatga tcacagacat gagaccgttg tcacttgaga ccataataac atcactaacc   720

Page 1

```
agagacatca taacacacaa atttatatac ttgataaatc atgaatgcat agtgagaaaa        780

cttgatgaaa agcaggccac atttacattc ctggtcaact atgaaatgaa actattacac        840

aaagtaggaa gcactaaata taaaaaatat actgaataca acacaaaata tggcactttc        900

cctatgccaa tattcatcaa tcatgatggg ttcttagaat gcattggcat taagcctaca        960

aagcatactc ccataatata caagtatgat ctcaatccat aaatttcaac acaatattca       1020

cacaatctaa aacaacaact ctatgcataa ctatactcca tagtccagat ggagcctgaa       1080

aattatagta atttaaaact taaggagaga tataagatag aagatggggc aaatacaacc       1140

atggctctta gcaaagtcaa gttgaatgat acactcaaca aagatcaact tctgtcatcc       1200

agcaaataca ccatccaacg gagcacagga gatagtattg atactcctaa ttatgatgtg       1260

cagaaacaca tcaataagtt atgtggcatg ttattaatca cagaagatgc taatcataaa       1320

ttcactgggt aataggtat gttatatgcg atgtctaggt taggaagaga agacaccata       1380

aaaatactca gagatgcggg atatcatgta aaagcaaatg gagtagatgt aacaacacat       1440

cgtcaagaca ttaatggaaa agaaatgaaa tttgaagtgt taacattggc aagcttaaca       1500

actgaaattc aaatcaacat tgagatagaa tctagaaaat cctacaaaaa aatgctaaaa       1560

gaaatgggag aggtagctcc agaatacagg catgactctc ctgattgtgg gatgataata       1620

ttatgtatag cagcattagt aataactaaa ttagcagcag gggacagatc tggtcttaca       1680

gccgtgatta ggagagctaa taatgtccta aaaaatgaaa tgaaacgtta caaaggctta       1740

ctacccaagg acatagccaa cagcttctat gaagtgtttg aaaaacatcc ccactttata       1800

gatgttttttg ttcattttgg tatagcacaa tcttctacca gaggtggcag tagagttgaa       1860

gggattttttg caggattgtt tatgaatgcc tatggtgcag ggcaagtgat gttacggtgg       1920

ggagtcttag caaaatcagt taaaaatatt atgttaggac atgctagtgt gcaagcagaa       1980

atggaacaag ttgttgaggt ttatgaatat gcccaaaaat tgggtggtga agcaggattc       2040

taccatatat tgaacaaccc aaaagcatca ttattatctt tgactcaatt tcctcacttc       2100

tccagtgtag tattaggcaa tgctgctggc ctaggcataa tgggagagta cagaggtaca       2160

ccgaggaatc aagatctata tgatgcagca aaggcatatg ctgaacaact caaagaaaat       2220

ggtgtgatta actacagtgt actagacttg acagcagaag aactagaggc tatcaaacat       2280

cagcttaatc caaaagataa tgatgtagag ctttgagtta ataaaaaatg gggcaaataa       2340

atcatcatgg aaaagtttgc tcctgaattc catggagaag atgcaaacaa cagggctact       2400

aaaattccta gaatcaataa agggcaaattc acatcaccca aagatcccaa gaaaaaagat       2460

agtatcatat ctgtcaactc aatagatata gaagtaacca agaaagccc tataacatca       2520

aattcaacta ttatcaaccc aacaaatgag acagatgata ctgcagggaa caagcccaat       2580

tatcaaagaa aacctctagt aagtttcaaa gaagaccctta caccaagtga taatcccttt       2640
```

```
tctaaactat acaaagaaac catagaaaca tttgataaca atgaagaaga atccagctat      2700

tcatacgaag aaataaatga tcagacaaac gataatataa cagcaagatt agataggatt      2760

gatgaaaaat taagtgaaat actaggaatg cttcacacat tagtagtggc aagtgcagga      2820

cctacatctg ctcgggatgg tataagagat gccatggttg gtttaagaga agaaatgata      2880

gaaaaaatca gaactgaagc attaatgacc aatgacagat tagaagctat ggcaagactc      2940

aggaatgagg aaagtgaaaa gatggcaaaa gacacatcag atgaagtgtc tctcaatcca      3000

acatcagaga aattgaacaa cctattggaa gggaatgata gtgacaatga tctatcactt      3060

gaagatttct gattagttac caatcttcac atcaacacac aataccaaca gaagaccaac      3120

aaactaacca acccaatcat ccaaccaaac atccatccgc caatcagcca aacagccaac      3180

aaaacaacca gccaatccaa aactaaccac ccggaaaaaa tctataatat agttacaaaa      3240

aaaggaaagg gtggggcaaa tatggaaaca tacgtgaaca agcttacgaa aggctccaca      3300

tacacagctg ctgttcaata caatgtctta gaaaaagacg atgaccctgc atcacttaca      3360

atatgggtgc ccatgttcca atcatctatg ccagcagatt tacttataaa agaactagct      3420

aatgtcaaca tactagtgaa acaaatatcc acacccaagg gaccttcact aagagtcatg      3480

ataaactcaa gaagtgcagt gctagcacaa atgcccagca aatttaccat atgcgctaat      3540

gtgtccttgg atgaaagaag caaactagca tatgatgtaa ccacaccctg tgaaatcaag      3600

gcatgtagtc taacatgcct aaaatcaaaa aatatgttga ctacagttaa agatctcact      3660

atgaagacac tcaaccctac acatgatatt attgctttat gtgaatttga aaacatagta      3720

acatcaaaaa aagtcataat accaacatac ctaagatcca tcagtgtcag aaataaagat      3780

ctgaacacac ttgaaaatat aacaaccact gaattcaaaa atgctatcac aaatgcaaaa      3840

atcatccctt actcaggatt actattagtc atcacagtga ctgacaacaa aggagcattc      3900

aaatacataa agccacaaag tcaattcata gtagatcttg gagcttacct agaaaaagaa      3960

agtatatatt atgttaccac aaaattggaag cacacagcta cacgatttgc aatcaaaccc      4020

atggaagatt aaccttttc ctctacatca gtgtgttaat tcatacaaac tttctaccta      4080

cattcttcac ttcaccatca caatcacaaa cactctgtgg ttcaaccaat caaacaaaac      4140

ttatctgaag tcccagatca tcccaagtca ttgtttatca gatctagtac tcaaataagt      4200

taataaaaaa tatacacatg gggcaaataa tcattggagg aaatccaact aatcacaata      4260

tctgttaaca tagacaagtc cacacaccat acagaatcaa ccaatggaaa atacatccat      4320

aacaatagaa ttctcaagca aattctggcc ttactttaca ctaatacaca tgatcacaac      4380

aataatctct ttgctaatca taatctccat catgattgca atactaaaca aactttgtga      4440

atataacgta ttccataaca aaacctttga gttaccaaga gctcgagtca acacatagca      4500
```

```
ttcatcaatc caacagccca aaacagtaac cttgcattta aaaatgaaca acccctacct    4560

ctttacaaca cctcattaac atcccaccat gcaaaccact atccatacta taaagtagtt    4620

aattaaaaat agtcataaca atgaactagg atatcaagac taacaataac attggggcaa    4680

atgcaaacat gtccaaaaac aaggaccaac gcaccgctaa gacattagaa aggacctggg    4740

acactctcaa tcatttatta ttcatatcat cgtgcttata taagttaaat cttaaatctg    4800

tagcacaaat cacattatcc attctggcaa tgataatctc aacttcactt ataattgcag    4860

ccatcatatt catagcctcg gcaaaccaca aagtcacacc aacaactgca atcatacaag    4920

atgcaacaag ccagatcaag aacacaaccc aacatacct cacccagaat cctcagcttg    4980

gaatcagtcc ctctaatccg tctgaaatta catcacaaat caccaccata ctagcttcaa    5040

caacaccagg agtcaagtca accctgcaat ccacaacagt caagaccaaa aacacaacaa    5100

caactcaaac acaacccagc aagcccacca caaaacaacg ccaaaacaaa ccaccaagca    5160

aacccaataa tgattttcac tttgaagtgt tcaactttgt accctgcagc atatgcagca    5220

acaatccaac ctgctgggct atctgcaaaa gaataccaaa caaaaaacca ggaaagaaaa    5280

ccactaccaa gcccacaaaa aaaccaaccc tcaagacaac caaaaaagat cccaaacctc    5340

aaaccactaa atcaaaggaa gtacccacca ccaagcccac agaagagcca accatcaaca    5400

ccaccaaaac aaacatcata actacactac tcacctccaa caccacagga aatccagaac    5460

tcacaagtca aatggaaacc ttccactcaa cttcctccga aggcaatcca agcccttctc    5520

aagtctctac aacatccgag tacccatcac aaccttcatc tccacccaac acaccacgcc    5580

agtagttact taaaaacata ttatcacaaa aggccttgac caacttaaac agaatcaaaa    5640

taaactctgg ggcaaataac aatggagttg ctaatcctca aagcaaatgc aattaccaca    5700

atcctcactg cagtcacatt ttgttttgct tctggtcaaa acatcactga agaattttat    5760

caatcaacat gcagtgcagt tagcaaaggc tatcttagtg ctctgagaac tggttggtat    5820

accagtgtta taactataga attaagtaat atcaagaaaa ataagtgtaa tggaacagat    5880

gctaaggtaa aattgataaa acaagaatta gataaatata aaaatgctgt aacagaattg    5940

cagttgctca tgcaaagcac acaagcaaca aacaatcgag ccagaagaga actaccaagg    6000

tttatgaatt atacactcaa caatgccaaa aaaaccaatg taacattaag caagaaaagg    6060

aaaagaagat ttcttggttt tttgttaggt gttggatctg caatcgccag tggcgttgct    6120

gtatctaagg tcctgcacct agaaggggaa gtgaacaaga tcaaaagtgc tctactatcc    6180

acaaacaagg ctgtagtcag cttatcaaat ggagttagtg ttttaaccag caaagtgtta    6240

gacctcaaaa actatataga taaacaattg ttacctattg tgaacaagca aagctgcagc    6300

atatcaaata tagaaactgt gatagagttc caacaaaaga caacagact actagagatt    6360

accagggaat ttagtgttaa tgcaggcgta actacacctg taagcactta catgttaact    6420
```

```
aatagtgaat  tattgtcatt  aatcaatgat  atgcctataa  caaatgatca  gaaaaagtta        6480

atgtccaaca  atgttcaaat  agttagacag  caaagttact  ctatcatgtc  cataataaaa        6540

gaggaagtct  tagcatatgt  agtacaatta  ccactatatg  gtgttataga  tacaccctgt        6600

tggaaactac  acacatcccc  tctatgtaca  accaacacaa  aagaagggtc  caacatctgt        6660

ttaacaagaa  ctgacagagg  atggtactgt  gacaatgcag  gatcagtatc  tttcttccca        6720

caagctgaaa  catgtaaagt  tcaatcaaat  cgagtatttt  gtgacacaat  gaacagttta        6780

acattaccaa  gtgaagtaaa  tctctgcaat  gttgacatat  tcaaccccaa  atatgattgt        6840

aaaattatga  cttcaaaaac  agatgtaagc  agctccgtta  tcacatctct  aggagccatt        6900

gtgtcatgct  atggcaaaac  taaatgtaca  gcatccaata  aaaatcgtgg  aatcataaag        6960

acattttcta  acgggtgcga  ttatgtatca  aataaagggg  tggacactgt  gtctgtaggt        7020

aacacattat  attatgtaaa  taagcaagaa  ggtaaaagtc  tctatgtaaa  aggtgaacca        7080

ataataaatt  tctatgaccc  attagtattc  ccctctgatg  aatttgatgc  atcaatatct        7140

caagtcaacg  agaagattaa  ccagagccta  gcatttattc  gtaaatccga  tgaattatta        7200

cataatgtaa  atgctggtaa  atccaccaca  aatatcatga  taactactat  aattatagtg        7260

attatagtaa  tattgttatc  attaattgct  gttggactgc  tcttatactg  taaggccaga        7320

agcacaccag  tcacactaag  caaagatcaa  ctgagtggta  taaataatat  tgcatttagt        7380

aactaaataa  aaatagcacc  taatcatgtt  cttacaatgg  tttactatct  gctcatagac        7440

aacccatctg  tcattggatt  ttcttaaaat  ctgaacttca  tcgaaactct  catctataaa        7500

ccatctcact  tacactattt  aagtagattc  ctagtttata  gttatataaa  acacaattgc        7560

atgccagatt  aacttaccat  ctgtaaaaat  gaaaactggg  gcaaatatgt  cacgaaggaa        7620

tccttgcaaa  tttgaaattc  gaggtcattg  cttaaatggt  aagaggtgtc  attttagtca        7680

taattatttt  gaatggccac  cccatgcact  gcttgtaaga  caaaacttta  tgttaaacag        7740

aatacttaag  tctatggata  aaagtataga  taccttatca  gaaataagtg  gagctgcaga        7800

gttggacaga  acagaagagt  atgctcttgg  tgtagttgga  gtgctagaga  gttatatagg        7860

atcaataaac  aatataacta  aacaatcagc  atgtgttgcc  atgagcaaac  tcctcactga        7920

actcaatagt  gatgatatca  aaaagctgag  ggacaatgaa  gagctaaatt  cacccaagat        7980

aagagtgtac  aatactgtca  tatcatatat  tgaaagcaac  aggaaaaaca  ataaacaaac        8040

tatccatctg  ttaaaaagat  tgccagcaga  cgtattgaag  aaaaccatca  aaaacacatt        8100

ggatatccat  aagagcataa  ccatcaacaa  cccaaaagaa  tcaactgtta  gtgatacaaa        8160

tgaccatgcc  aaaaataatg  atactacctg  acaaatatcc  ttgtagtata  acttccatac        8220

taataacaag  tagatgtaga  gttactatgt  ataatcaaaa  gaacacacta  tatttcaatc        8280
```

```
aaaacaaccc aaataaccat atgtactcac cgaatcaaac attcaatgaa atccattgga      8340

cctctcaaga attgattgac acaattcaaa attttctaca acatctaggt attattgagg      8400

atatatatac aatatatata ttagtgtcat aacactcaat tctaacactc accacatcgt      8460

tacattatta attcaaacaa ttcaagttgt gggacaaaat ggatcccatt attaatggaa      8520

attctgctaa tgtttatcta accgatagtt atttaaaagg tgttatctct ttctcagagt      8580

gtaatgcttt aggaagttac atattcaatg gtccttatct caaaaatgat tataccaact      8640

taattagtag acaaaatcca ttaatagaac acatgaatct aaagaaacta aatataacac      8700

agtccttaat atctaagtat cataaaggtg aaataaaatt agaagaacct acttattttc      8760

agtcattact tatgacatac aagagtatga cctcgtcaga acagattgct accactaatt      8820

tacttaaaaa gataataaga agagctatag aaataagtga tgtcaaagtc tatgctatat      8880

tgaataaact agggcttaaa gaaaaggaca agattaaatc caacaatgga caagatgaag      8940

acaactcagt tattacgacc ataatcaaag atgatatact ttcagctgtt aaagataatc      9000

aatctcatct taaagcagac aaaaatcact ctacaaaaca aaaagacaca atcaaaacaa      9060

cactcttgaa gaaattgatg tgttcaatgc aacatcctcc atcatggtta atacattggt      9120

ttaacttata cacaaaatta aacaacatat taacacagta tcgatcaaat gaggtaaaaa      9180

accatgggtt tacattgata gataatcaaa ctcttagtgg atttcaattt attttgaacc      9240

aatatggttg tatagtttat cataaggaac tcaaaagaat tactgtgaca acctataatc      9300

aattcttgac atggaaagat attagcctta gtagattaaa tgtttgttta attacatgga      9360

ttagtaactg cttgaacaca ttaaataaaa gcttaggctt aagatgcgga ttcaataatg      9420

ttatcttgac acaactattc ctttatggag attgtatact aaagctattt cacaatgagg      9480

ggttctacat aataaaagag gtagagggat ttattatgtc tctaattta aatataacag       9540

aagaagatca attcagaaaa cgattttata atagtatgct caacaacatc acagatgctg      9600

ctaataaagc tcagaaaaat ctgctatcaa gagtatgtca tacattatta gataagacag      9660

tgtccgataa tataataaat ggcagatgga taattctatt aagtaagttc cttaaattaa      9720

ttaagcttgc aggtgacaat aaccttaaca atctgagtga actatatttt ttgttcagaa      9780

tatttggaca cccaatggta gatgaaagac aagccatgga tgctgttaaa attaattgca      9840

atgagaccaa attttacttg ttaagcagtc tgagtatgtt aagaggtgcc tttatatata      9900

gaattataaa agggtttgta ataattaca acagatggcc tactttaaga aatgctattg      9960

ttttaccctt aagatggtta acttactata aactaaacac ttatccttct ttgttggaac     10020

ttacagaaag agatttgatt gtgttatcag gactacgttt ctatcgtgag tttcggttgc     10080

ctaaaaaagt ggatcttgaa atgattataa atgataaagc tatatcacct cctaaaaatt     10140

tgatatggac tagtttccct agaaattaca tgccatcaca catacaaaac tatatagaac     10200
```

atgaaaaatt aaaattttcc gagagtgata aatcaagaag agtattagag tattatttaa 10260

gagataacaa attcaatgaa tgtgatttat acaactgtgt agttaatcaa agttatctca 10320

acaaccctaa tcatgtggta tcattgacag gcaaagaaag agaactcagt gtaggtagaa 10380

tgtttgcaat gcaaccggga atgttcagac aggttcaaat attggcagag aaaatgatag 10440

ctgaaaacat tttacaattc tttcctgaaa gtcttacaag atatggtgat ctagaactac 10500

aaaaaatatt agaactgaaa gcaggaataa gtaacaaatc aaatcgctac aatgataatt 10560

acaacaatta cattagtaag tgctctatca tcacagatct cagcaaattc aatcaagcat 10620

ttcgatatga aacgtcatgt atttgtagtg atgtgctgga tgaactgcat ggtgtacaat 10680

ctctattttc ctggttacat ttaactattc ctcatgtcac aataatatgc acatataggc 10740

atgcacccc ctatatagga gatcatattg tagatcttaa caatgtagat gaacaaagtg 10800

gattatatag atatcacatg ggtggcatcg aagggtggtg tcaaaaacta tggaccatag 10860

aagctatatc actattggat ctaatatctc tcaaagggaa attctcaatt actgctttaa 10920

ttaatggtga caatcaatca atagatataa gcaaaccaat cagactcatg gaaggtcaaa 10980

ctcatgctca agcagattat ttgctagcat taaatagcct taaattactg tataaagagt 11040

atgcaggcat aggccacaaa ttaaaaggaa ctgagactta tatatcacga gatatgcaat 11100

ttatgagtaa aacaattcaa cataacggtg tatattaccc agctagtata aagaaagtcc 11160

taagagtggg accgtggata aacactatac ttgatgattt caaagtgagt ctagaatcta 11220

taggtagttt gacacaagaa ttagaatata gaggtgaaag tctattatgc agtttaatat 11280

ttagaaatgt atggttatat aatcagattg ctctacaatt aaaaaatcat gcattatgta 11340

acaataaact atatttggac atattaaagg ttctgaaaca cttaaaaacc ttttttaatc 11400

ttgataatat tgatacagca ttaacattgt atatgaattt acccatgtta tttggtggtg 11460

gtgatcccaa cttgttatat cgaagtttct atagaagaac tcctgacttc ctcacagagg 11520

ctatagttca ctctgtgttc atacttagtt attatacaaa ccatgactta aaagataaac 11580

ttcaagatct gtcagatgat agattgaata agttcttaac atgcataatc acgtttgaca 11640

aaaaccctaa tgctgaattc gtaacattga tgagagatcc tcaagcttta gggtctgaga 11700

gacaagctaa aattactagc gaaatcaata gactggcagt tacagaggtt ttgagtacag 11760

ctccaaacaa aatattctcc aaaagtgcac aacattatac tactacagag atagatctaa 11820

atgatattat gcaaaatata gaacctacat atcctcatgg gctaagagtt gtttatgaaa 11880

gtttacccct ttataaagca gagaaaatag taaatcttat atcaggtaca aaatctataa 11940

ctaacatact ggaaaaaact tctgccatag acttaacaga tattgataga gccactgaga 12000

tgatgaggaa aaacataact ttgcttataa ggatacttcc attggattgt aacagagata 12060

aaagagagat attgagtatg gaaaacctaa gtattactga attaagcaaa tatgttaggg   12120

aaagatcttg gtctttatcc aatatagttg gtgttacatc acccagtatc atgtatacaa   12180

tggacatcaa atatactaca agcactatat ctagtggcat aattatagag aaatataatg   12240

ttaacagttt aacacgtggt gagagaggac ccactaaacc atgggttggt tcatctacac   12300

aagagaaaaa aacaatgcca gtttataata gacaagtctt aaccaaaaaa cagagagatc   12360

aaatagatct attagcaaaa ttggattggg tgtatgcatc tatagataac aaggatgaat   12420

tcatggaaga actcagcata ggaacccttg ggttaacata tgaaaaggcc aagaaattat   12480

ttccacaata tttaagtgtc aattatttgc atcgccttac agtcagtagt agaccatgtg   12540

aattccctgc atcaatacca gcttatagaa caacaaatta tcactttgac actagcccta   12600

ttaatcgcat attaacagaa aagtatggtg atgaagatat tgacatagta ttccaaaact   12660

gtataagctt tggccttagt ttaatgtcag tagtagaaca atttactaat gtatgtccta   12720

acagaattat tctcatacct aagcttaatg agatacattt gatgaaacct cccatattca   12780

caggtgatgt tgatattcac aagttaaaac aagtgataca aaaacagcat atgttttac   12840

cagacaaaat aagtttgact caatatgtgg aattattctt aagtaataaa acactcaaat   12900

ctggatctca tgttaattct aatttaatat tggcacataa aatatctgac tattttcata   12960

atacttacat tttaagtact aatttagctg gacattggat tctgattata caacttatga   13020

aagattctaa aggtattttt gaaaaagatt ggggagaggg atatataact gatcatatgt   13080

ttattaattt gaaagttttc ttcaatgctt ataagaccta tctcttgtgt tttcataaag   13140

gttatggcaa agcaaagctg gagtgtgata tgaacacttc agatcttcta tgtgtattgg   13200

aattaataga cagtagttat tggaagtcta tgtctaaggt atttttagaa caaaaagtta   13260

tcaaatacat tcttagccaa gatgcaagtt tacatagagt aaaaggatgt catagcttca   13320

aattatggtt tcttaaacgt cttaatgtag cagaattcac agtttgccct tgggttgtta   13380

acatagatta tcatccaaca catatgaaag caatattaac ttatatagat cttgttagaa   13440

tgggattgat aaatatagat agaatacaca ttaaaaataa acacaaattc aatgatgaat   13500

tttatacttc taatctcttc tacattaatt ataacttctc agataatact catctattaa   13560

ctaaacatat aaggattgct aattctgaat tagaaaataa ttacaacaaa ttatatcatc   13620

ctacaccaga aaccctagag aatatactag ccaatccgat taaaagtaat gacaaaaaga   13680

cactgaatga ctattgtata ggtaaaaatg ttgactcaat aatgttacca ttgttatcta   13740

ataagaagct tattaaatcg tctgcaatga ttagaaccaa ttacagcaaa caagatttgt   13800

ataatttatt ccctatggtt gtgattgata gaattataga tcattcaggc aatacagcca   13860

aatccaacca actttacact actacttccc accaaatatc cttagtgcac aatagcacat   13920

cactttactg catgcttcct tggcatcata ttaatagatt caattttgta tttagttcta   13980

```
caggttgtaa aattagtata gagtatattt taaaagatct taaaattaaa gatcccaatt    14040

gtatagcatt cataggtgaa ggagcaggga atttattatt gcgtacagta gtggaacttc    14100

atcctgacat aagatatatt tacagaagtc tgaaagattg caatgatcat agtttaccta    14160

ttgagttttt aaggctgtac aatggacata tcaacattga ttatggtgaa aatttgacca    14220

ttcctgctac agatgcaacc aacaacattc attggtctta tttacatata aagtttgctg    14280

aacctatcag tctttttgtc tgtgatgccg aattgtctgt aacagtcaac tggagtaaaa    14340

ttataataga atggagcaag catgtaagaa agtgcaagta ctgttcctca gttaataaat    14400

gtatgttaat agtaaaatat catgctcaag atgatattga tttcaaatta gacaatataa    14460

ctatattaaa aacttatgta tgcttaggca gtaagttaaa gggatcggag gtttacttag    14520

tccttacaat aggtcctgcg aatatattcc cagtatttaa tgtagtacaa aatgctaaat    14580

tgatactatc aagaaccaaa aatttcatca tgcctaagaa agctgataaa gagtctattg    14640

atgcaaatat taaaagtttg ataccctttc tttgttaccc tataacaaaa aaaggaatta    14700

atactgcatt gtcaaaacta aagagtgttg ttagtggaga tatactatca tattctatag    14760

ctggacgtaa tgaagttttc agcaataaac ttataaatca taagcatatg aacatcttaa    14820

aatggttcaa tcatgtttta aatttcagat caacagaact aaactataac catttatata    14880

tggtagaatc tacatatcct tacctaagtg aattgttaaa cagcttgaca accaatgaac    14940

ttaaaaaact gattaaaatc acaggtagtc tgttatacaa cttttcataat gaataatgaa    15000

taaagatctt ataataaaaa ttcccatagc tatacactaa cactgtattc aattatagtt    15060

attaaaaatt aaaaatcata taatttttta aataactttt agtgaactaa tcctaaagtt    15120

atcattttaa tcttggagga ataaatttaa accctaatct aattggttta tatgtgtatt    15180

aactaaatta cgagatatta gttttttgaca cttttttttct cgt                    15223
```

<210> 2
<211> 15225
<212> DNA
<213> Respiratory Syncytial Virus

<400> 2
```
acgcgaaaaa atgcgtacta caaacttgca cattcggaaa aaatgggggca aataagaatt     60

tgataagtgc tatttaagtc taaccttttc aatcagaaat ggggtgcaat tcactgagca    120

tgataaaggt tagattacaa aatttatttg acaatgacga agtagcattg ttaaaaataa    180

catgttatac tgacaaatta attcttctga ccaatgcatt agccaaagca gcaatacata    240

caattaaatt aaacggtata gttttttatac atgttataac aagcagtgaa gtgtgccctg    300

ataacaacat tgtagtaaaa tctaacttta caacaatgcc aatattacaa aacggaggat    360

acatatggga attgattgag ttgacacact gctctcaatt aaacggtcta atggatgata    420
```
                                    Page 9
```

attgtgaaat caaatttct aaaagactaa gtgactcagt aatgactaat tatatgaatc     480

aaatatctga tttacttggg cttgatctca attcatgaat tatgtttagt ctaactcaat     540

agacatgtgt ttattaccat tttagttaat ataaaaactc atcaaaggga aatggggcaa     600

ataaactcac ctaatcaatc aaactatgag cactacaaat gacaacacta ctatgcaaag     660

attaatgatc acggacatga gacccctgtc gatggattca ataataacat ctctcaccaa     720

agaaatcatc acacacaaat tcatatactt gataaacaat gaatgtattg taagaaaact     780

tgatgaaaga caagctacat ttacattctt agtcaattat gagatgaagc tactgcacaa     840

agtagggagt accaaataca agaaatacac tgaatataat acaaaatatg gcactttccc     900

catgcctata tttatcaatc atggcgggtt tctagaatgt attggcatta agcctacaaa     960

acacactcct ataatataca aatatgacct caacccgtaa attccaacaa aaaaaaccaa    1020

cccaaccaaa ccaagctatt cctcaaacaa caatgctcaa tagttaagaa ggagctaatc    1080

cgttttagta attaaaaata aaagtaaagc caataacata aattggggca aatacaaaga    1140

tggctcttag caaagtcaag ttaaatgata cattaaataa ggatcagctg ctgtcatcca    1200

gcaaatacac tattcaacgt agtacaggag ataatattga cactcccaat tatgatgtgc    1260

aaaaacacct aaacaaacta tgtggtatgc tattaatcac tgaagatgca aatcataaat    1320

tcacaggatt aataggtatg ttatatgcta tgtccaggtt aggaagggaa gacactataa    1380

agatacttaa agatgctgga tatcatgtta aagctaatgg agtagatata acaacatatc    1440

gtcaagatat aaatggaaag gaaatgaaat tcgaagtatt aacattatca agcttgacat    1500

cagaaataca agtcaatatt gagatagaat ctagaaaatc ctacaaaaaa atgctaaaag    1560

agatgggaga agtggctcca gaatataggc atgattctcc agactgtggg atgataatac    1620

tgtgtatagc agcacttgta ataccaaat tagcagcagg agacagatca ggtcttacag    1680

cagtaattag gagggcaaac aatgtcttaa aaaatgaaat aaaacgctac aagggtctca    1740

taccaaagga tatagctaac agttttatg aagtgtttga aaaacaccct catcttatag    1800

atgttttgt gcactttggc attgcacaat catcaacaag aggggtagt agagttgaag    1860

gaatctttgc aggattgttt atgaatgcct atggttcagg caagtaatg ctaagatggg    1920

gagttttagc caaatctgta aaaaatatca tgctaggtca tgctagtgtc caggcagaaa    1980

tggagcaagt tgtggaagtc tatgagtatg cacagaagtt gggaggagaa gctggattct    2040

accatatatt gaacaatcca aaagcatcat tgctgtcatt aactcaattt cctaacttct    2100

caagtgtggt cctaggcaat gcagcaggtc taggcataat gggagagtat agaggtacgc    2160

caagaaacca ggatctttat gatgcagcca agcatatgc agagcaactc aaagaaaatg    2220

gagtaataaa ctacagtgta ttagacttaa cagcagaaga attggaagcc ataaagaatc    2280

```
aactcaaccc taaagaagat gatgtagagc tttaagttaa caaaaaatac ggggcaaata    2340

agtcaacatg gagaagtttg cacctgaatt tcatggagaa gatgcaaata acaaagctac    2400

caaattccta gaatcaataa agggcaagtt cgcatcatcc aaagatccta agaagaaaga    2460

tagcataata tctgttaact caatagatat agaagtaacc aaagagagcc cgataacatc    2520

tggcaccaac atcatcaatc caacaagtga agccgacagt accccagaaa ccaaagccaa    2580

ctacccaaga aaacccctag taagcttcaa agaagatctc accccaagtg acaacccttt    2640

ttctaagttg tacaaagaaa caatagaaac atttgataac aatgaagaag aatctagcta    2700

ctcatatgaa gagataaatg atcaaacaaa tgacaacatt acagcaagac tagatagaat    2760

tgatgaaaaa ttaagtgaaa tattaggaat gctccataca ttagtagttg caagtgcagg    2820

acccacttca gctcgcgatg gaataagaga tgctatggtt ggtctgagag aagaaatgat    2880

agaaaaaata agagcggaag cattaatgac caatgatagg ttagaggcta tggcaagact    2940

taggaatgag gaaagcgaaa aaatggcaaa agacacctca gatgaagtgc ctcttaatcc    3000

aacttccaaa aaattgagtg acttgttgga agacaacgat agtgacaatg atctgtcact    3060

tgatgatttt tgatcagtga tcaactcact cagcaatcaa caacatcaat aaaacagaca    3120

tcaatccatt gaatcaactg ccagaccgaa caaacaaatg tccgtcagcg gaaccaccaa    3180

ccaatcaatc aaccaactga tccatcagca acctgacgaa attaacaata tagtaacaaa    3240

aaaagaacaa gatggggcaa atatggaaac atacgtgaac aagcttcacg aaggctccac    3300

atacacagca gctgttcagt acaatgttct agaaaaagat gatgatcctg catcactaac    3360

aatatgggtg cctatgttcc agtcatctgt accagcagac ttgctcataa aagaacttgc    3420

aagcatcaac atactagtga agcagatctc tacgcccaaa ggaccttcac tacgagtcac    3480

gattaactca agaagtgctg tgctggctca aatgcctagt aatttcatca taagcgcaaa    3540

tgtatcatta gatgaaagaa gcaaattagc atatgatgta actacacctt gtgaaatcaa    3600

agcatgcagt ctaacatgct taaaagtgaa aagtatgtta actacagtca aagatcttac    3660

catgaagaca ttcaacccca ctcatgagat cattgctcta tgtgaatttg aaaatattat    3720

gacatcaaaa agagtaataa taccaaccta tctaagacca attagtgtca aaaacaagga    3780

tctgaactca ctagaaaaca tagcaaccac cgaattcaaa aatgctatca ccaatgcgaa    3840

aattattccc tatgctggat tagtattagt tatcacagtt actgacaata aaggagcatt    3900

caaatatatc aagccacaga gtcaatttat agtagatctt ggtgcctacc tagaaaaaga    3960

gagcatatat tatgtgacta ctaattggaa gcatacagct acacgttttt caatcaaacc    4020

actagaggat taaatttaat tatcaacact gaatgacagg tccacatata tcctcaaact    4080

acacactata tccaaacatc atgaacatct acactacaca cttcatcaca caaaccaatc    4140

ccactcaaaa tccaaaatca ctaccagcca ctatctgcta gacctagagt gcgaataggt    4200
```

```
aaataaaacc aaaatatggg gtaaatagac attagttaga gttcaatcaa tctcaacaac        4260

catttatacc gccaattcaa tacatatact ataaatctta aaatgggaaa tacatccatc        4320

acaatagaat tcacaagcaa attttggccc tattttacac taatacatat gatcttaact        4380

ctaatctctt tactaattat aatcactatt atgattgcaa tactaaataa gctaagtgaa        4440

cataaaacat tctgtaacaa tactcttgaa ctaggacaga tgcatcaaat caacacatag        4500

tgctctacca tcatgctgtg tcaaattata atcctgtata tataaacaaa caaatccaat        4560

cttctcacag agtcatggtg tcgcaaaacc acgccaacta tcatggtagc atagagtagt        4620

tatttaaaaa ttaacataat gatgaattat tagtatggga tcaaaaacaa cattggggca        4680

aatgcaacca tgtccaaaca caagaatcaa cgcactgcca ggactctaga aaagacctgg        4740

gatactctca atcatctaat tgtaatatcc tcttgtttat acagattaaa tttaaaatct        4800

atagcacaaa tagcactatc agttctggca atgataatct caacctctct cataattgca        4860

gccataatat tcatcatctc tgccaatcac aaagttacac taacaacggt cacagttcaa        4920

acaataaaaa accacactga aaaaaacatc accacctacc ttactcaagt cccaccagaa        4980

agggttagct catccaaaca acctacaacc acatcaccaa tccacacaaa ttcagccaca        5040

acatcacccα acacaaagtc agaaacacac cacacaacag cacaaaccaa aggcagaacc        5100

accacctcaa cacagaccaa caagccgagc acaaaaccac gcctaaaaaa tccaccaaaa        5160

aaaccaaaag atgattacca ttttgaagtg ttcaacttcg ttccctgtag tatatgtggc        5220

aacaatcaac tttgcaaatc catctgtaaa acaataccaa gcaacaaacc aaagaagaaa        5280

ccaaccatca aacccacaaa caaaccaacc accaaaacca caaacaaaag agacccaaaa        5340

acaccagcca aaacgacgaa aaaagaaact accaccaacc caacaaaaaa accaacccta       5400

acgaccacag aaagagacac cagcacctca caatccactg tgctcgacac aaccacatta        5460

gaacacacaa tccaacagca atccctccac tcaaccaccc ccgaaaacac acccaactcc        5520

acacaaacac ccacagcatc cgagccctct acatcaaatt ccacccaaaa tacccaatca        5580

catgcttagt tattcaaaaa ctacatctta gcagaaaacc gtgacctatc aagcaagaac        5640

gaaattaaac ctggggcaaa taaccatgga gctgctgatc cacaggttaa gtgcaatctt        5700

cctaactctt gctattaatg cattgtacct cacctcaagt cagaacataa ctgaggagtt        5760

ttaccaatcg acatgtagtg cagttagcag aggttatttt agtgctttaa gaacaggttg        5820

gtataccagt gtcataacaa tagaattaag taatataaaa gaaaccaaat gcaatggaac        5880

tgacactaaa gtaaaactta taaaacaaga attagataag tataagaatg cagtgacaga        5940

attacagcta cttatgcaaa acacaccagc tgccaacaac cgggccagaa gagaagcacc        6000

acagtatatg aactatacaa tcaataccac taaaaaccta aatgtatcaa taagcaagaa        6060
```

```
gaggaaacga agatttctgg gcttcttgtt aggtgtagga tctgcaatag caagtggtat        6120

agctgtatcc aaagttctac accttgaagg agaagtgaac aagatcaaaa atgctttgtt        6180

atctacaaac aaagctgtag tcagtctatc aaatggggtc agtgttttaa ccagcaaagt        6240

gttagatctc aagaattaca taaataacca attattaccc atagtaaatc aacagagctg        6300

tcgcatctcc aacattgaaa cagttataga attccagcag aagaacagca gattgttgga        6360

aatcaacaga gaattcagtg tcaatgcagg tgtaacaaca cctttaagca cttacatgtt        6420

aacaaacagt gagttactat cattgatcaa tgatatgcct ataacaaatg atcagaaaaa        6480

attaatgtca agcaatgttc agatagtaag gcaacaaagt tattctatca tgtctataat        6540

aaaggaagaa gtccttgcat atgttgtaca gctacctatc tatggtgtaa tagatacacc        6600

ttgctggaaa ttacacacat cacctctatg caccaccaac atcaaagaag gatcaaatat        6660

ttgtttaaca aggactgata gaggatggta ttgtgataat gcaggatcag tatccttctt        6720

tccacaggct gacacttgta aagtacagtc caatcgagta ttttgtgaca ctatgaacag        6780

tttgacatta ccaagtgaag tcagcctttg taacactgac atattcaatt ccaagtatga        6840

ctgcaaaatt atgacatcaa aaacagacat aagcagctca gtaattactt ctcttggagc        6900

tatagtgtca tgctatggta aaactaaatg cactgcatcc aacaaaaatc gtgggattat        6960

aaagacattt tctaatggtt gtgactatgt gtcaaacaaa ggagtagata ctgtgtcagt        7020

gggcaacact ttatactatg taaacaagct ggaaggcaag aacctttatg taaaagggga        7080

acctataata aattactatg accctctagt gtttccttct gatgagtttg atgcatcaat        7140

atctcaagtc aatgaaaaaa tcaatcaaag tttagctttt attcgtagat ctgatgaatt        7200

actacataat gtaaatactg gcaaatctac tacaaatatt atgataacta caattattat        7260

agtaatcatt gtagtattgt tatcattaat agctattggt ttgctgttgt attgcaaagc        7320

caaaaacaca ccagttacac taagcaaaga ccaactaagt ggaatcaata atattgcatt        7380

cagcaaatag acaaaaaacc acctgatcat gtttcaacaa cagtctgctg atcaccaatc        7440

ccaaatcaac ccataacaaa cacttcaaca tcacagtaca ggctgaatca tttcttcaca        7500

tcatgctacc cacacaacta agctagatcc ttaactcata gttacataaa aacctcaagt        7560

atcacaatca aacactaaat caacacatca ttcacaaaat taacagctgg ggcaaatatg        7620

tcgcgaagaa atccttgtaa atttgagatt agaggtcatt gcttgaatgg tagaagatgt        7680

cactacagtc ataattactt tgaatggcct cctcatgcct tactagtgag gcaaaacttc        7740

atgttaaaca agatactcaa gtcaatggac aaaagcatag acactttgtc tgaaataagt        7800

ggagctgctg aactggacag aacagaagaa tatgctcttg gtatagttgg agtgctagag        7860

agttacatag gatctataaa caacataaca aaacaatcag catgtgttgc tatgagtaaa        7920

cttcttattg agatcaatag tgatgacatt aaaaagctga gagataatga agaacccaat        7980
```

```
tcacctaaga taagagtgta caatactgtt atatcataca ttgagagcaa tagaaaaaac     8040

aacaagcaaa caatccatct gctcaaaaga ctaccagcag acgtgctgaa gaagacaata     8100

aaaaacacat tagatatcca caaaagcata atcataagca acccaaaaga gtcaaccgtg     8160

aatgatcaaa atgaccaaac caaaaataat gatattaccg gataaatatc cttgtagtat     8220

atcatccata ttgatttcaa gtgaaagcat gattgctaca ttcaatcata aaaacatatt     8280

acaatttaac cataaccatt tggataacca ccagcgttta ttaaataata tatttgatga     8340

aattcattgg acacctaaaa acttattaga tgccactcaa caatttctcc aacatcttaa     8400

catccctgaa gatatatata caatatatat attagtgtca taatgcttgg ccataacgat     8460

tctatatcat ccaaccataa aactatctta ataaggttat gggacaaaat ggatcccatt     8520

attaatggaa actctgctaa tgtgtatcta actgatagtt atttaaaagg tgttatctct     8580

ttttcagaat gtaatgcttt agggagttac ctttttaacg gcccttatct caaaaatgat     8640

tacaccaact taattagtag acaaagtcca ctactagagc atatgaatct taaaaaacta     8700

actataacac agtcattaat atctagatat cataaaggtg aactgaaatt agaagaacca     8760

acttatttcc agtcattact tatgacatat aaaagcatgt cctcgtctga caaaattgct     8820

acaactaact tacttaaaaa aataatacga agagctatag aaataagtga tgtaaaggtg     8880

tacgccatct tgaataaact aggactaaag gaaaaggaca gagttaagcc caacaataat     8940

tcaggtgatg aaaactcagt acttacaact ataattaaag atgatatact ttcggctgtg     9000

gaaagcaatc aatcatatac aaattcagac aaaaatcact cagtaaatca aaatatcact     9060

atcaaaacaa cactcttgaa aaaattgatg tgttcaatgc aacatcctcc atcatggtta     9120

atacactggt tcaatttata tacaaaatta aataacatat taacacaata tcgatcaaat     9180

gaggtaaaaa gtcatgggtt tatattaata gataatcaaa ctttaagtgg ttttcagttt     9240

attttaaatc aatatggttg tatcgtttat cataaaggac tcaaaaaaat cacaactact     9300

acttacaatc aatttttaac atggaaagac atcagcctta gcagattaaa tgtttgctta     9360

attacttgga taagtaattg tttgaataca ttaaataaaa gcttagggct gagatgtgga     9420

ttcaataatg ttgtgttatc acaattattt ctttatggag attgtatact gaaattattt     9480

cataatgaag gcttctacat aataaaagaa gtagagggat ttattatgtc tttaattcta     9540

aacataacag aagaagatca atttaggaaa cgatttata atagcatgct aaataacatc     9600

acagatgcag ctattaaggc tcaaaagaac ctactatcaa gggtatgtca cactttatta     9660

gacaagacag tgtctgataa tatcataaat ggtaaatgga taatcctatt aagtaaattt     9720

cttaaattga ttaagcttgc aggtgataat aatctcaata atttgagtga gctatatttt     9780

ctcttcagaa tctttggaca tccaatggtt gatgaaagac aagcaatgga tgctgtaaga     9840
```

```
attaactgta atgaaactaa gttctactta ttaagtagtc taagtacgtt aagaggtgct        9900

ttcatttata gaatcataaa agggtttgta aatacctaca acagatggcc cactttaagg        9960

aatgctattg tcctacctct aagatggtta aactattata aacttaatac ttatccatct       10020

ctacttgaaa tcacagaaaa tgatttgatt attttatcag gattgcggtt ctatcgtgaa       10080

tttcatctgc ctaaaaaagt ggatcttgaa atgataataa atgacaaagc catttcacct       10140

ccaaaagatc taatatggac tagttttcct agaaattaca tgccatcaca tatacaaaat       10200

tatatagaac atgaaaagtt gaagttctct gaaagcgaca gatcaagaag agtactagag       10260

tattacttga gagataataa attcaatgaa tgcgatctat acaattgtgt agtcaatcaa       10320

agctatctca acaactctaa tcacgtggta tcactaactg gtaaagaaag agagctcagt       10380

gtaggtagaa tgtttgctat gcaaccaggt atgtttaggc aaatccaaat cttagcagag       10440

aaaatgatag ccgaaaatat tttacaattc ttccctgaga gtttgacaag atatggtgat       10500

ctagagcttc aaaagatatt agaattaaaa gcaggaataa gcaacaagtc aaatcgttat       10560

aatgataact acaacaatta tatcagtaaa tgttctatca ttacagatct tagcaaattc       10620

aatcaagcat ttagatatga aacatcatgt atctgcagtg atgtattaga tgaactgcat       10680

ggagtacaat ctctgttctc ttggttgcat ttaacaatac ctcttgtcac aataatatgt       10740

acatatagac atgcacctcc tttcataaag gatcatgttg ttaatcttaa tgaagttgat       10800

gaacaaagtg gattatacag atatcatatg ggtggtattg agggctggtg tcaaaaactg       10860

tggaccattg aagctatatc attattagat ctaatatctc tcaaagggaa attctctatc       10920

acagctctga taaatggtga taatcagtca attgatataa gtaaaccagt tagacttata       10980

gagggtcaga cccatgctca agcagattat ttgttagcat taaatagcct taaattgcta       11040

tataaagagt atgcaggtat aggccataag cttaagggaa cagagaccta tatatcccga       11100

gatatgcagt tcatgagcaa aacaatccag cacaatggag tgtactatcc agccagtatc       11160

aaaaaagtcc tgagagtagg tccatggata aatacaatac ttgatgattt taaagttagt       11220

ttagaatcta taggtagctt aacacaggag ttagaataca gaggggaaag cttattatgc       11280

agtttaatat ttaggaacat ttggttatac aatcaaattg ctttgcaact ccgaaatcat       11340

gcattatgta acaataagct atatttagat atattgaaag tattaaaaca cttaaaaact       11400

tttttttaatc ttgatagtat cgatatggcg ttatcattgt atatgaattt gcctatgctg       11460

tttggtggtg gtgatcctaa tttgttatat cgaagctttt ataggagaac tccagacttc       11520

cttacagaag ctatagtaca ttcagtgttt gtgttgagct attatactgg tcacgattta       11580

caagataagc tccaggatct tccagatgat agactgaaca aattcttgac atgtgtcatc       11640

acattcgata aaaatcccaa tgccgagttt gtaacattga tgagggatcc acaggcgtta       11700

gggtctgaaa ggcaagctaa aattactagt gagattaata gattagcagt aacagaagtc       11760
```

ttaagtatag ctccaaacaa aatattttct aaaagtgcac aacattatac taccactgag   11820

attgatctaa atgacattat gcaaaatata gaaccaactt accctcatgg attaagagtt   11880

gtttatgaaa gtctaccttt ttataaagca gaaaaaatag ttaatcttat atcaggaaca   11940

aaatccataa ctaatatact tgaaaaaaca tcagcaatag atacaactga tattaatagg   12000

gctactgata tgatgaggaa aaatataact ttacttataa ggatacttcc actagattgt   12060

aacaaagaca aaagagagtt attaagttta gaaaatctta gtataactga attaagcaag   12120

tatgtaagag aaagatcttg gtcattatcc aatatagtag gagtaacatc gccaagtatt   12180

atgttcacaa tggacattaa atatacaact agcactatag ccagtggtat aattatagaa   12240

aaatataatg ttaatagttt aactcgtggt gaaagaggac ctactaagcc atgggtaggt   12300

tcatctacgc aggagaaaaa aacaatgcca gtgtacaata gacaagtttt aaccaaaaag   12360

caaagagacc aaatagattt attagcaaaa ttagactggg tatatgcatc catagacaac   12420

aaagatgaat tcatggaaga actgagtact ggaacacttg gactgtcata tgaaaaagcc   12480

aaaaagttgt ttccacaata tctaagtgtc aattatttac accgtttaac agtcagtagt   12540

agaccatgtg aattccctgc atcaatacca gcttatagaa caacaaatta tcatttcgat   12600

actagtccta tcaatcatgt attaacagaa aagtatggag atgaagatat cgacattgtg   12660

tttcaaaatt gcataagttt tggtcttagc ctgatgtcgg ttgtggaaca attcacaaac   12720

atatgtccta atagaattat tctcataccg aagctgaatg agatacattt gatgaaacct   12780

cctatattta caggagatgt tgatatcatc aagttgaagc aagtgataca aaaacagcat   12840

atgttcctac cagataaaat aagtttaacc caatatgtag aattattcct aagtaacaaa   12900

gcacttaaat ctggatctaa catcaattct aatttaatat tagtacataa aatgtctgat   12960

tattttcata atgcttatat tttaagtact aatttagctg acattggat tctaattatt   13020

caacttatga aagattcaaa aggtattttt gaaaaagatt ggggagaggg gtacataact   13080

gatcatatgt tcattaattt gaatgttttc tttaatgctt ataagactta tttgctatgt   13140

tttcataaag gttatggtaa agcaaaatta gaatgtgata tgaacacttc agatcttctt   13200

tgtgttttgg agttaataga cagtagctac tggaaatcta tgtctaaagt tttcctagaa   13260

caaaaagtca taaaatacat agtcaatcaa gacacaagtt tgcatagaat aaaaggctgt   13320

cacagtttta agttgtggtt tttaaaacgc cttaataatg ctaaatttac cgtatgccct   13380

tgggttgtta acatagatta tcacccaaca catatgaaag ctatattatc ttacatagat   13440

ttagttagaa tggggttaat aaatgtagat aaattaacca ttaaaaataa aaacaaattc   13500

aatgatgaat tttacacatc aaatctcttt tacattagtt ataacttttc agacaacact   13560

catttgctaa caaaacaaat aagaattgct aattcagaat tagaagataa ttataacaaa   13620

ctatatcacc caaccccaga aactttagaa aatatatcat taattcctgt taaaagtaat   13680

aatagtaaca aacctaaatt ttgtataagt ggaaataccg aatctataat gatgtcaaca   13740

ttctctaata aaatgcatat taaatcttcc actgttacca caagattcaa ttatagcaaa   13800

caagacttgt acaatttatt tccaaatgtt gtgatagaca ggattataga tcattcaggt   13860

aatacagcaa aatctaacca actttacatc accacttcac atcagacatc tttagtaagg   13920

aatagtgcat cactttattg catgcttcct tggcatcatg tcaatagatt taactttgta   13980

tttagttcca caggatgcaa gatcagtata gagtatattt taaaagatct taagattaag   14040

gaccccagtt gtatagcatt cataggtgaa ggagctggta acttattatt acgtacggta   14100

gtagaacttc atccagacat aagatacatt tacagaagtt taaaagattg caatgatcat   14160

agtttaccta ttgaatttct aagattatac aacgggcata taaacataga ttatggtgag   14220

aatttaacca ttcctgctac agatgcaact aataacattc attggtctta tttacatata   14280

aaatttgcag aacctattag catctttgtc tgcgatgctg aattacctgt tacagccaat   14340

tggagtaaaa ttataattga atggagtaag catgtaagaa agtgcaagta ctgttcttct   14400

gtaaatagat gcattttaat cgcaaaatat catgctcaag atgatattga tttcaaatta   14460

gataacatta ctatattaaa aacttacgtg tgcctaggta gcaagttaaa aggatctgaa   14520

gtttacttag tccttacaat aggccctgca aatatacttc ctgttttga tgttgtgcaa   14580

aatgctaaat tgattttttc aagaactaaa aatttcatta tgcctaaaaa aactgacaag   14640

gaatctatcg atgcaaatat taaaagctta ataccttccc tttgttaccc tataacaaaa   14700

aaaggaatta agacttcatt gtcaaaattg aagagtgtag ttaatgggga tatattatca   14760

tattctatag ctggacgtaa tgaagtattc agcaacaagc ttataaacca caagcatatg   14820

aatatcctaa aatggctaga tcatgtttta aattttagat cagctgaact taattacaat   14880

catttataca tgatagagtc cacatatcct tacttaagtg aattgttaaa tagtttaaca   14940

accaatgagc tcaagaaact gattaaaata acaggtagtg tactatacaa ccttcccaac   15000

gaacagtaac ttaaaatatc attaacaagt ttggtcaaat ttagatgcta acacatcatt   15060

atattatagt tattaaaaaa tatgcaaact tttcaataat ttagcttact gattccaaaa   15120

ttatcatttt attttttaagg ggttgaataa aagtctaaaa ctaacaatga tacatgtgca   15180

tttacaacac aacgagacat tagttttga cactttttttt ctcgt   15225

<210> 3
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Positive-sense M gene fragment

<400> 3
actcaaataa gttaataaaa aatatcccgg gat   33

<210> 4
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Negative-sense M gene fragment

<400> 4
cccgggatat tttttattaa cttatttgag t   31

<210> 5
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Positive-sense primer uptream of SH gene

<400> 5
gaaagtatat attatgtt   18

<210> 6
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Negative-sense primer downstream of SH gene

<400> 6
tatataagca cgatgatatg   20

<210> 7
<211> 16
<212> DNA
<213> Artificial Sequence

<220>
<223> Positive-sense M gene fragment

<400> 7
actcaaataa gttaat   16

<210> 8
<211> 14
<212> DNA
<213> Artificial Sequence

<220>
<223> Negative-sense M gene fragment

<400> 8
taacttattt gagt   14

<210> 9
<211> 28
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward PCR primer for NS1 gene deletion

<400> 9
gacacaaccc acaatgataa tacaccac   28

<210> 10
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse PCR primer for NS1 gene deletion

<400> 10
catctctaac caagggagtt aaatttaagt gg   32

<210> 11
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward PCR primer for NS2 gene deletion

<400> 11
ttaaggagag atataagata gaagatg   27

<210> 12
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse PCR primer for NS2 gene deletion

<400> 12
gttttatatt aactaatggt gttagtg   27

<210> 13
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Forward PCR primer for ablation of G gene start site

<400> 13
ttataattgc agccatcata ttcatagcct cgg   33

<210> 14
<211> 30

<212> DNA
<213> Artificial Sequence

<220>
<223> Reverse PCR primer for ablation of G gene start site

<400> 14
gtgaagttga gattacaatt gccagaatgg   30

<210> 15
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Positive-sense primer for intergenic region preceding the G gene

<400> 15
gcatggatcc ttaattaaaa attaacataa tgatgaatta ttagtatg   48

<210> 16
<211> 51
<212> DNA
<213> Artificial Sequence

<220>
<223> Negative-sense primer for intergenic region downstream of F gene

<400> 16
gtgttggatc ctgattgcat gcttgaggtt tttatgtaac tatgagttaa g   51

<210> 17
<211> 13
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: G gene-end signal

<400> 17
agttattcaa aaa   13

<210> 18
<211> 48
<212> DNA
<213> Artificial Sequence

<220>
<223> Positve-sense primer with G gene-end and F gene-start signals

<400> 18
ccacgcctaa tgagttatat aaaacaattg gggcaaataa ccatggag   48

<210> 19
<211> 46
<212> DNA
<213> Artificial Sequence

<220>
<223> Negative-sense primer with G gene-end and F gene-start signals

<400> 19
gactgagtgt tctgagtaga gttggatgta gagggctcgg atgctg   46

<210> 20
<211> 12
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: F gene-end signal of RSV A2

<400> 20
agttatataa aa   12

<210> 21
<211> 13
<212> DNA
<213> Artificial Sequence

<220>
<223> G gene-end signal of RSV A2

<400> 21
agttacttaa aaa   13

<210> 22
<211> 51
<212> RNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<220>
<221> misc_feature
<222> (5)..(5)
<223> n, if present, is c

<400> 22
aaaanuuaag gagagauaua agauagaaga uggggcaaau acaamsaugg c   51

<210> 23
<211> 53
<212> RNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 23
uuaaaaacau auuaucacaa aargccwuga ccaacuuaaa cagaaucaaa aua   53

<210> 24
<211> 51

<212> RNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 24
aaacacaauu gmaugccaga uuaacuuacc aucuguaaaa augaaaacug g   51

<210> 25
<211> 73
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 25
ccaaaaaagt cccgggtcaa aaatggggca aataagaatt tgataagtac cacttaaatt   60

taactctaga atg   73

<210> 26
<211> 49
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 26
taactgcagt attcaattat agttattaaa aattaacccg ggaaatcat   49

<210> 27
<211> 27
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 27
atgagaccgt wgtmacytga gaccata   27

<210> 28
<211> 9
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic peptide

<400> 28

Met Arg Pro Leu Ser Leu Glu Thr Ile
1   5

<210> 29

```
<211>    13
<212>    DNA
<213>    Artificial Sequence

<220>
<223>    Synthetic oligonucleotide

<400>    29
agttaatata aaa                                                          13


<210>    30
<211>    13
<212>    DNA
<213>    Artificial Sequence

<220>
<223>    Synthetic oligonucleotide

<400>    30
agttaataaa aaa                                                          13


<210>    31
<211>    12
<212>    DNA
<213>    Artificial Sequence

<220>
<223>    Synthetic oligonucleotide

<400>    31
agtaatttaa aa                                                           12


<210>    32
<211>    13
<212>    DNA
<213>    Artificial Sequence

<220>
<223>    Synthetic oligonucleotide

<400>    32
agttaataaa aaa                                                          13


<210>    33
<211>    9
<212>    PRT
<213>    Artificial Sequence

<220>
<223>    Synthetic peptide


<220>
<221>    misc_feature
<222>    (4)..(4)
<223>    Xaa is Met or Ile

<220>
<221>    misc_feature
```

<222> (5)..(5)
<223> Xaa is Ile or Val

<400> 33

Ile Leu Ala Xaa Xaa Ile Ser Thr Ser
1   5

<210> 34
<211> 27
<212> RNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 34
auucuggcaa ukruaaucuc aacuuca   27

<210> 35
<211> 43
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 35
actataaagt agttaattaa aaattaacat aatgatgaat tat   43

<210> 36
<211> 54
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 36
cttaactcat agttacataa aaacctcaag catgccagat taacttacca tctg   54

<210> 37
<211> 66
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic oligonucleotide

<400> 37
tccaactcta ctcagaacac tcagtcccac gcctaatgag ttatataaaa caattggggc   60

aaataa   66

<210> 38
<211> 11
<212> PRT

<213>   Artificial Sequence

<220>
<223>   Synthetic oligonucleotide

<400>   38

Ser Asn Ser Thr Gln Asn Thr Gln Ser His Ala
1   5   10